

Panel 2: Interoperability and Compatibility

Moderator: Mr. Carl Bullock. *Chief, Modernization Division, Forecast Systems Laboratory, Office of Oceanic and Atmospheric Research, National Oceanic and Atmospheric Administration (NOAA)*

Rapporteurs: Ms. Cynthia Ann Nelson, *Senior Meteorologist, Office of the Federal Coordinator for Meteorology*
Mr. Blaine Tsugawa, *Senior Meteorologist, Office of the Federal Coordinator for Meteorology*

Synopsis

Mr. Bullock convened the panel session on Interoperability and Compatibility and introduced the panel members. He next commented on the panel's topic in terms of the "push" from technology to get a handle on how to promote interoperability and compatibility of various observational systems. He noted that NOAA's Forecast Systems Laboratory (FSL) is pushing the envelope by using observations from home stations reported by ham radio. The NOAA NWS Weather Forecast Office's Science Officer in Jacksonville, Florida, has established a link working with local networks (mesonets) to receive observations automatically via radio transmission to an Internet site. These observations assist the WFO forecaster to give better warnings on local squall lines and severe storms. Next year, there will be Internet access from cars, which could allow transmission of observations from the car's temperature sensor tied with its GPS location. The cell phone companies could piggyback off of a radiosonde package and remote cell phone connections to take and send in observations. Mr. Bullock concluded his comments with questions for the panel and audience: "With so much data becoming available, will we lose the ability to work with it? Is there such a thing as too much data?"

Following the presentations by the panelists, Mr. Bullock opened the panel session to questions from the floor.

Question from the floor: How should the Internet's propensity for changing formats be handled?

Response: Panel members responded with:

- Allowing formats to change is one way to accommodate progress.
- eXtended Markup Language (XML) makes data more accessible, which is a positive; but expands the volume of data and the needed storage, which is a negative.
- Usability and industry standards will need to be addressed.

Question from the floor: How should format problems and a country's capabilities be addressed?

Response: Panelists and the audience comments were:

- Use of multiple data streams and Java scripts--these are approaches that enable distribution of information to a variety of users and assist in identifying "who gets what."
 - Customized data feeds/formats facilitate distribution to the point that only data, which the communication networks and users can be handled, are sent.
 - Reformat data before sending to countries with different capabilities.
- Format problems exist not only overseas but also in the United States. For example, the emergency management community has a wide range of capabilities but are still plagued by basic interoperability and compatibility differences.
 - WMO's approach is *the least common denominator* when considering these kinds of matters; we must not ignore and need to address the least common denominator.
- Codes and use of encoders and decoders – less is better and more commonality is needed, especially as we "mine" new data resources.
 - Computers can handle many of the noted encode/decode problems through use of middleware; middleware could also be used to change to different formats or make the format more human readable.
- WMO policy for exchange of data over the Global Telecommunications System (GTS) is to move toward greater use of table-driven code forms, such as BUFR, GRIB, and CREX. XML and NetCDF are good but should not dismiss the continued use of WMO table-driven codes. At a minimum, these WMO codes will be required for international exchange of data.
 - NWS communications gateway can handle reformatting U.S. data into WMO code form, if national formats are used or other formats are known and generally well-understood.

Question from the floor: Within the U.S. Navy, user requirements push what and how products and data are distributed. Has NOAA conducted a customer survey to address this?

Response: NWS performs assessments of user needs through user fora and surveys. In each of the WFOs, these types of activities fall under the primary duties of the Warning and Coordination Meteorologists.

Question from the floor: In terms of atmospheric information versus data, where do we convert data into information – locally, regionally, or centrally? Should we be considering processing at the observation sites for at least quality control issues?

Response: Panelists responses included the following:

- Currently, there are several places as well as organizational levels that perform these functions.
 - Central processing is done at – National Climatic Data Center, NWS National Centers for Environmental Prediction and Telecommunications Gateway, Fleet Numerical Meteorology and Oceanography Center, Air Force Weather Agency, and Federal Emergency Management Agency
 - Regionally - NWS regional headquarters
 - Locally – NWS Weather Forecast Offices
- Websites could do some processing with software tools.

Question from the floor: Some of the newer technologies have produced large quantities of data, such as remote sensing, lightning detection, NEXRAD, etc. Which of these have caused communication problems with sending the data to users? How can this problem be resolved? How do we accommodate the future availability of a 3-fold increase in satellite data?

Response:

- Data availability can be controlled via software at the observation site which limits the amount of data being sent forward.
- Use of various data formats/codes that can be compressed and, thereby, enable more data to be transmitted.
- Employ sophisticated satellite communication capabilities to allow different amounts of data to go to different users.